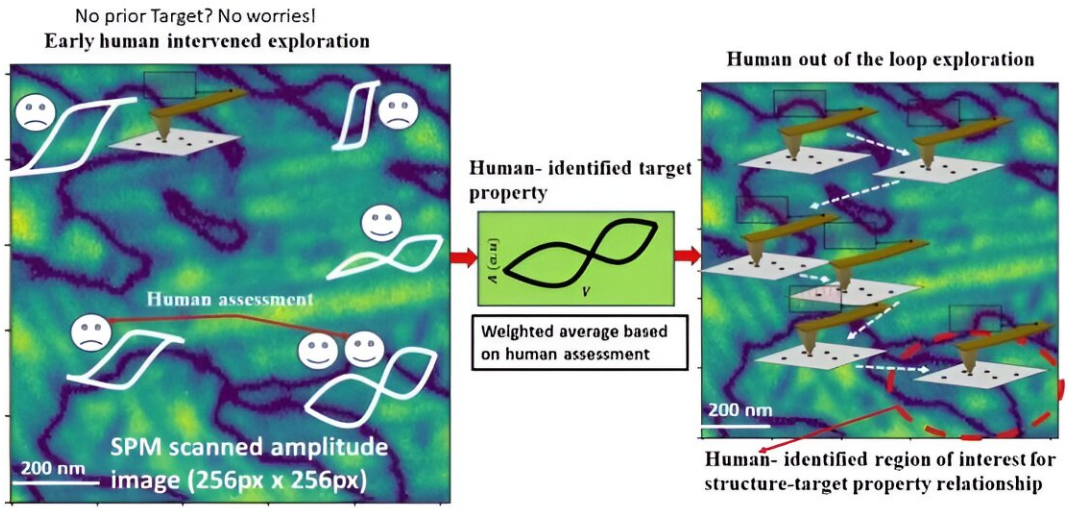
New system combines human, artificial intelligence to improve experimentation

February 21 2024, by Alexandra DeMarco



The workflow of the human-AI collaborator system developed at ORNL to improve experimentation. Credit: Arpan Biswas and Rama Vasudevan/ORNL, U.S. Dept. of Energy

Though artificial intelligence decreases human error in experimentation, human experts outperform AI when identifying causation or working with small data sets.

To capitalize on AI and researcher strengths, ORNL scientists, in collaboration with National Cheng Kung University, Taiwan, and the

University of Tennessee, Knoxville, developed a human-AI collaboration recommender system for improved experimentation performance.

During experiments, the system's machine learning algorithms, described in *npj Computational Materials*, display preliminary observations for human review. Researchers vote on data, telling the AI to show similar information or change direction, akin to a streaming service generating suggested content based on users' activity. After initial guidance, algorithms improve to illuminate relevant data with little human input.

"The foundation of this research is basically not the quantity of the data but the quality of the data that we are aiming for," ORNL's Arpan Biswas said.

The experiments and autonomous workflows were supported by the Center for Nanophase Materials Sciences, and algorithm development was supported by the MLExchange project to expand machine learning development at national laboratories.

More information: Arpan Biswas et al, A dynamic Bayesian optimized active recommender system for curiosity-driven partially Human-in-the-loop automated experiments, *npj Computational Materials* (2024). DOI: 10.1038/s41524-023-01191-5

Provided by Oak Ridge National Laboratory

Citation: New system combines human, artificial intelligence to improve experimentation (2024, February 21) retrieved 9 May 2024 from https://techxplore.com/news/2024-02-combines-human-artificial-intelligence-experimentation.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.